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Renesas Electronics Corporation

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H8/300L Super Low Power Series

4-Digit Decimal Counter (DECNT)

Introduction

The software DCNT increments a 4-digit binary-coded decimal (BCD) counter by 1 every time it is executed.

Target Device

H8/38024

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1. Arguments

Description	Memory area	Data length (bytes)
Input	—	—
Output	4-digit BCD counter	DCNTR (RAM)
	Counter overflow	C flag (CCR)
		2
		1

2. Changes to Internal Registers and Flags

R0	R1	R2	R3	R4	R5	R6	R7
○	—	—	—	—	—	—	×
I	U	H	U	N	Z	V	C
—	—	×	—	×	×	×	○

Legend

- : No change
- ×: Undefined
- : Result

3. Specifications

Program memory (bytes)	18
Data memory (bytes)	2
Stack (bytes)	0
Clock cycle count	28
Reentrant	Impossible
Relocation	Possible
Interrupt	Possible

4. Description

4.1 Details of functions

- The following arguments are used with the software DECNT:
 - DCNT: Used as a 4-digit BCD counter that is incremented by 1 each time the software DECNT is executed.
 - C flag (CCR): Indicates the state of the counter after execution of the software DECNT.
 - C flag = 1: The counter overflowed (See figure 2).
 - C flag = 0: The counter was incremented normally.
- The following figure illustrates the execution of the software DECNT. When the software DECNT is executed, the 4-digit BCD counter is incremented as shown in (2).

4.2 Notes on usage

As shown in figure 2, when the counter overflows, the counter value is set to 0.

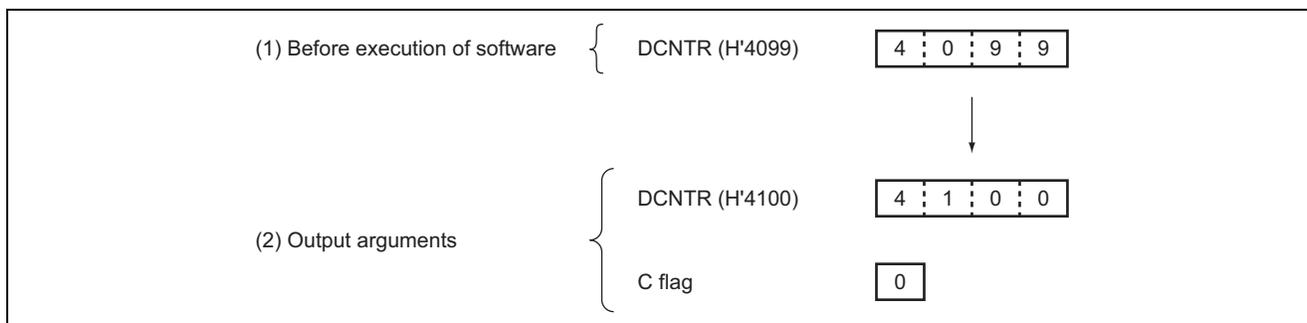


Figure 1 Example of Software DECNT Execution

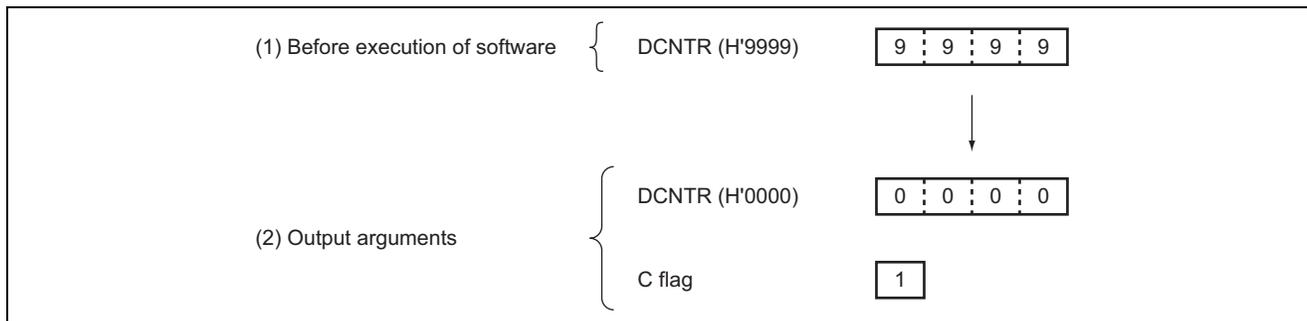
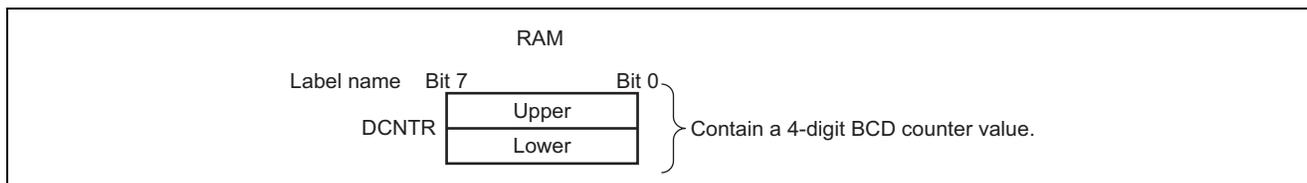
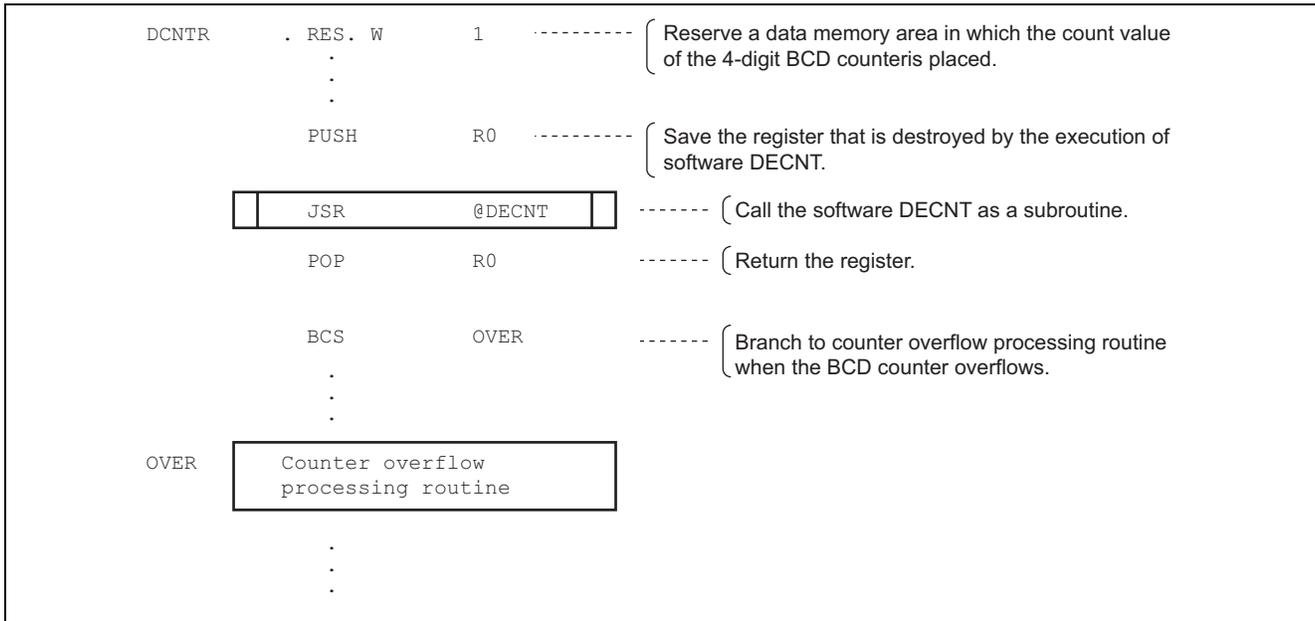


Figure 2 Example of Counter Overflow

4.3 Data memory



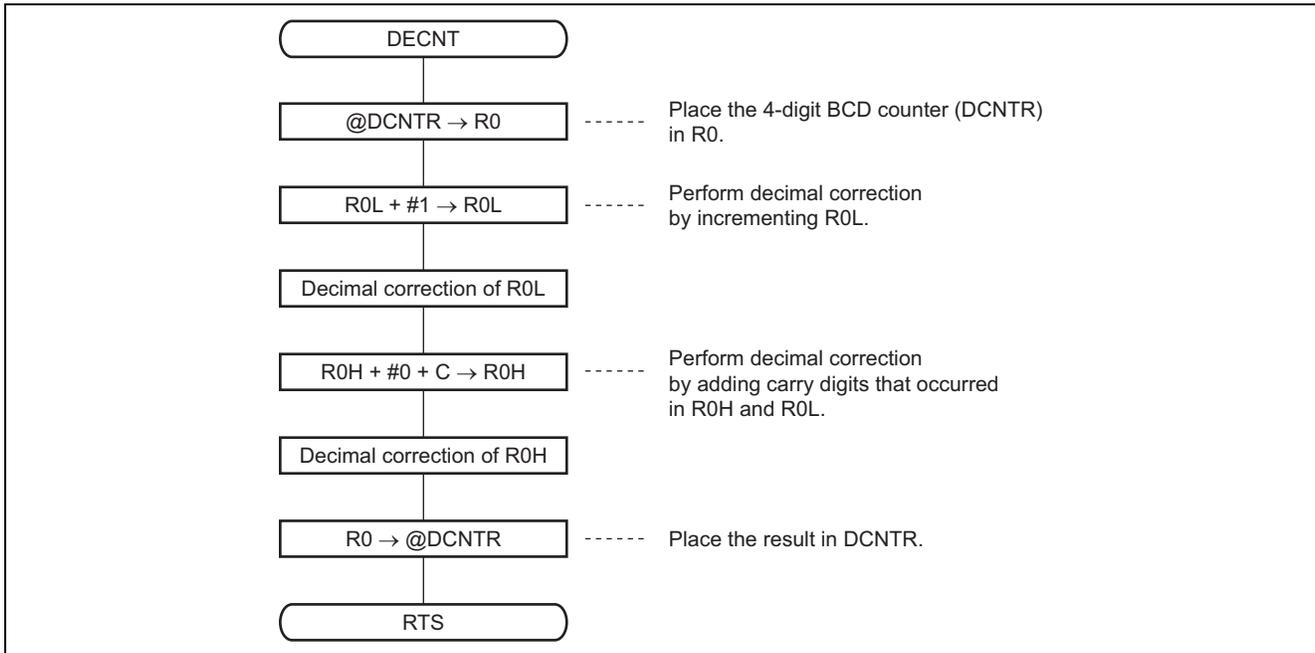
4.4 Example of usage



4.5 Operation

1. The software DECNT uses data memory (DCNTR) as a 4-digit BCD counter.
2. Each time the software DECNT is executed as a subroutine, it increments DCNTR and perform decimal correction.

5. Flowchart



6. Program List

```

*** H8/300 ASSEMBLER VER 1.0B ** 08/18/92 09:52:01
PROGRAM NAME =
1          ;*****
2          ;*
3          ;*   00-NAME   :4 FIGURE BCD COUNTER(DECNT)
4          ;*
5          ;*****
6          ;*
7          ;*   ENTRY    :NOTHING
8          ;*
9          ;*   RETURNS  :DCNTR (BCD COUNTER)
10         ;*           C flag OF CCR (C = 0 IS TRUE/C = 1 IS OVER FLOW)
11         ;*
12         ;*****
13         ;
14 DECNT_co C    0000          .SECTION          DECNT_code,CODE,ALIGN=2
15         .EXPORT          DECNT
16         ;
17 DECNT_co C          00000000 DECNT .EQU $          ;Entry point
18 DECNT_co C    0000 6B000000 MOV.W    @DCNTR,R0    ;Load DCNTR to R0
19 DECNT_co C    0004 8801     ADD.B    #'01,R0L    ;R0L + #'01 -> R0L
20 DECNT_co C    0006 0F08     DAA      R0L        ;Decimal adjust R0L
21 DECNT_co C    0008 9000     ADDX.B   #'00,R0H    ;R0H + #'00 + C -> R0H
22 DECNT_co C    000A 0F00     DAA      R0H        ;Decimal adjust R0H
23 DECNT_co C    000C 6B800000 MOV.W    R0,@DCNTR   ;Store R0 to DCNTR
24 DECNT_co C    0010 5470     RTS
25         ;
26         ;-----
27         ;
28 DATA_dat D    0000          .SECTION          DATA_data,DATA,ALIGN=2
29         .EXPORT          DCNTR
30         ;
31 DATA_dat D    0000 0000     DCNTR  .DATA.W H'0000
32         ;
33         ;-----
34         ;
35         .END
****TOTAL ERRORS 0
****TOTAL WARNINGS 0

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Revision Record

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		Page	Summary
1.00	Sep.18.03	—	First edition issued
2.00	Nov.30.06	All pages	Content correction

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